Common Specs for BAA -- AR&D Commonality

		LIDAR	Camera
Mission	Environment:		
	Thermal range	-30º to +50º C	-30º to +50º C
	Pressure range	< 1E-05 Pa to 101 kPa (14.7 psi)	< 1E-05 Pa to 101 kPa (14.7 psi)
	Internal/External mounting	External	External
	Radiation	LET $\geq$ 60 MeV-cm^2/mg	LET $\geq$ 60 MeV-cm^2/mg
	Regime (LEO, Cis-Lunar, Deep Space , etc.)	Deep Space and Cis-lunar	Deep Space and Cis-lunar
	Mission duration	>7 years	>7 years
	Operational	Total cumulative operational time of 1600 hours (200 days, 8 hours/day) to support multiple flybys and characterization. Supports multiple power on/off cycles, as well as long duration power on time.	Total cumulative operational time of 1600 hours (200 days, 8 hours/day) to support multiple flybys and characterization. Supports multiple power on/off cycles, as well as long duration power on time.
	Multiple engagements	One-time use for majority of applications. Yes for Robotic servicing and ARCM/Orion, they are the only multi-use of sensor suites	One-time use for majority of applications. Yes for Robotic servicing and ARCM/Orion, they are the only multi-use of sensor suites
	Dormancy	2-3 years (unit is off during transit from LEO to target)	2-3 years.
	Range		
	Minimum 50m - 1m 3D (Pose)	1 meter Sensor to target (sensor does not necessarily need to measure 0 m from sensor head to target of interest, but rather measure target to capture or docking 0 meter relative distance.	Minimum focus distance of 1 meter (sensor to target separation).
	Maximum 1km to 50m	2-3 km	Maximum focus distance of 1km (sensor to target separation). >50,000 km for bearing
	Field of view	±30º for ARRM ±10º for ARCM and SatServe 0.078º / pixel for ARCM 0.047º / pixel for Asteroid 0.057º / pixel is desired across the board (1 milli-radian)	Variable. Long-range operations will converge on ~10 deg FOV. Short-range operations will converge on something larger (50+ deg)-- the specific FOV will be target dependent, however, 50 deg is a good starting point.

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		LIDAR	Camera
Program	Environment:		
	Thermal range	-30º to +50º C	-30º to +50º C
	Accuracy	Dock/Capture (final 15m): RelPos = 2cm / axis (3-sigma) RelAtt = ±0.025º / axis (3-sigma) Medium and Long-range (define the range bounds for these phases): Range = 0.1% of range Bearing = < 1.5 mrad/measurement	Dock/Capture (final 15m): RelPos = 2cm / axis (3-sigma) RelAtt = ±0.025º / axis (3-sigma) Long-range (> 150km): < 8 urad/pix Short-range (< 100 m): < 300 urad/pix
	Processing	On-board and off-board Range, bearing and relative pose output by sensor to augment/accompany the raw imagery.	Raw image output.
	Output rate	30 Hz raw (524kBytes / frame) 1 to 5-10 Hz for processed data (range and bearing to N elements for processed data)	Long-range: 1 Hz Short-range: 5-10 Hz
	Data rate/baud	~ 16 Mbytes/second	~300 Mbps max science date rate (raw images)
	Cooperative/Un-cooperative	Majority are un-cooperative, but cooperative may aid in processing Un-cooperative is more stringent of the two scenarios.	Tailor FOV to give necessary resolution for rendezvous type (un-, non- or cooperative)
	Wavelength/eye-safe	Eye-safe if within crew compartment or aiming at a "manned" vehicle. Otherwise, non-eye safe possible if external or going to non-manned vehicle.	400-700nm visible 8-14 um IR camera
	Moving parts (mechanisms)	Desired to NOT have moving parts (not required)	Minimal moving parts allowed. Increases operational range of individual sensor, which allows fewer devices to cover the full operational range.
	Electronic parts requirements/policies?	CEV-T-027 Rev 2 EEE INST-002, Class 2	EEE INST-002, Class 2
	Fault tolerance	1-fault tolerant architecture at vehicle level, may not be (but could be) within the sensor box	1-fault tolerant architecture at vehicle level, may not be (but could be) within the sensor box
	Reliability		

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		LIDAR	Camera
	Environment:		
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Vehicle	Volume constraints	Two (2) VNS and two (2) cameras mounted to Orion docking hatch, with optics viewing through 8" diameter window (whose stack height is 4") is driving case for sensor packaging and sizing Total volume less 10,250 cm^3 (19x27x20 cm)	
	Mass constraints	< 10 kg per unit	NFOV: < 10 kg/unit M/WFOV: < 2kg/unit
	Power constraints	< 35 Watts per unit	NFOV: < 20 W MFOV: < 10 W
	Packaging considerations: sensor head/elctronics in I unit versus multiple sensor heads and a separate electronics unit		